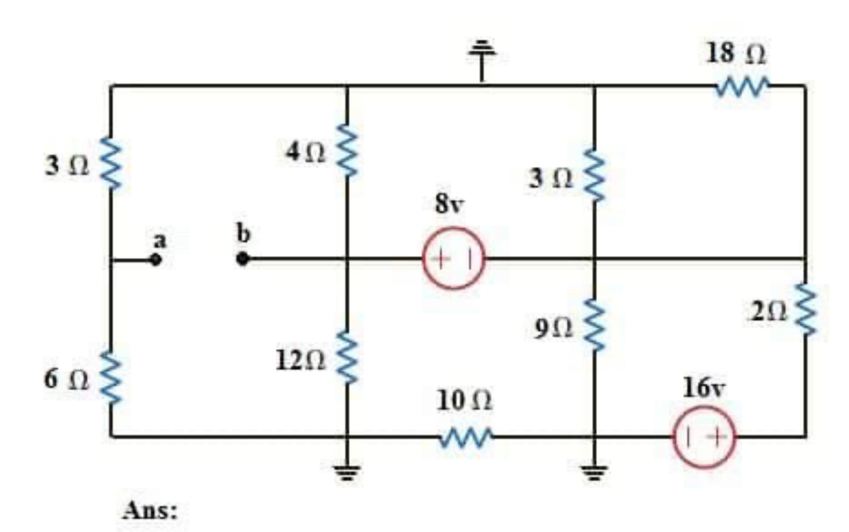
Using Simple Circuit Analysis, Find P_{8v} and Vab

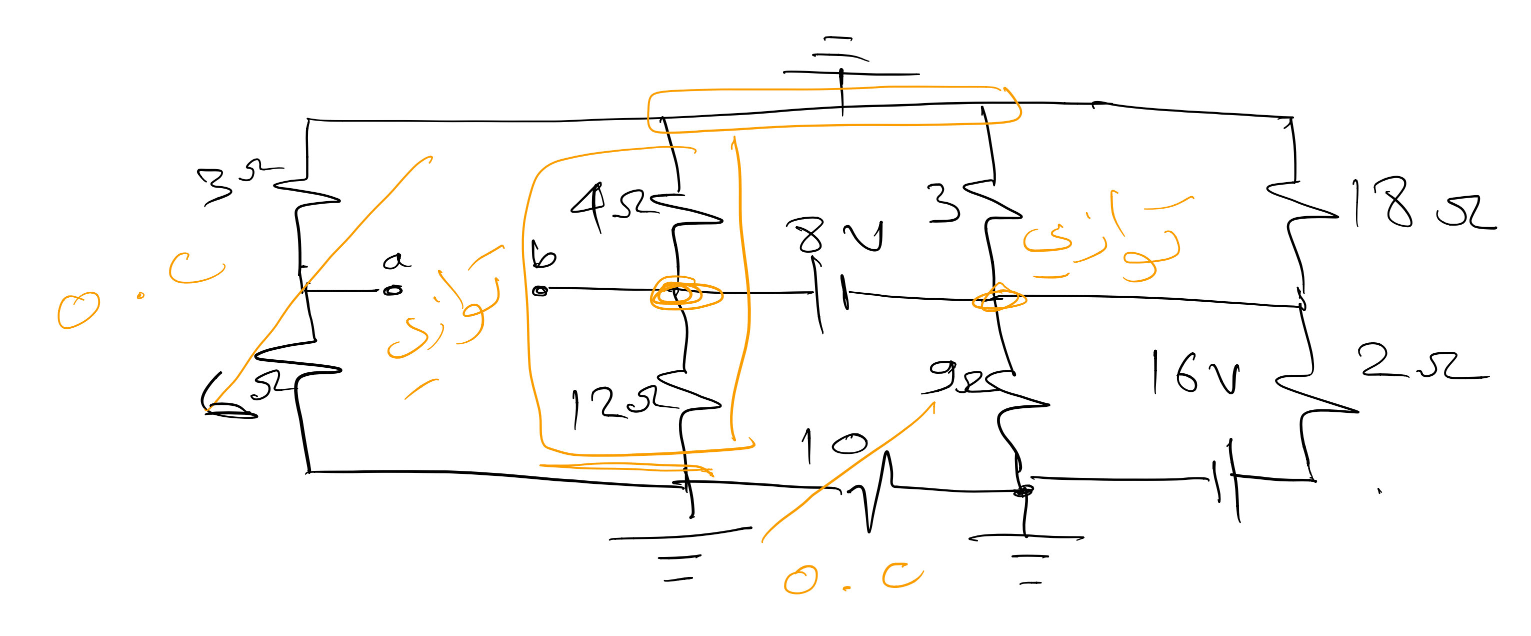


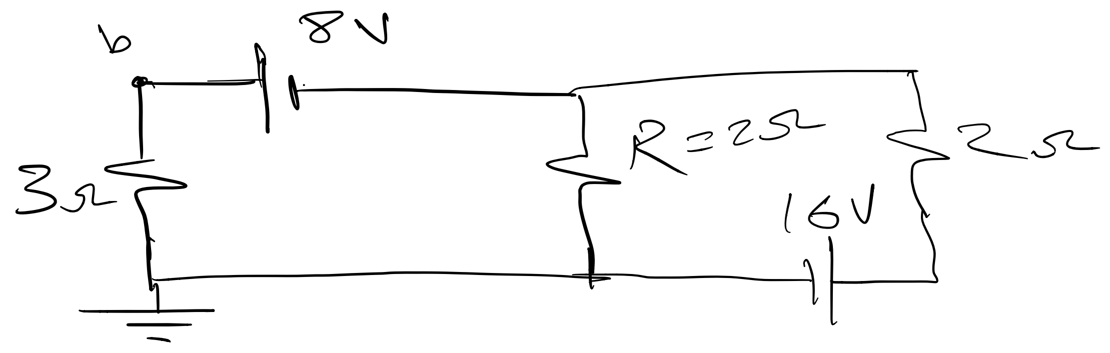
Ans:

P_{8v} = 32 w   Vab =12 v   Eng. M.Drebika

الحل باستخدام التوازي والتوالي و KVL

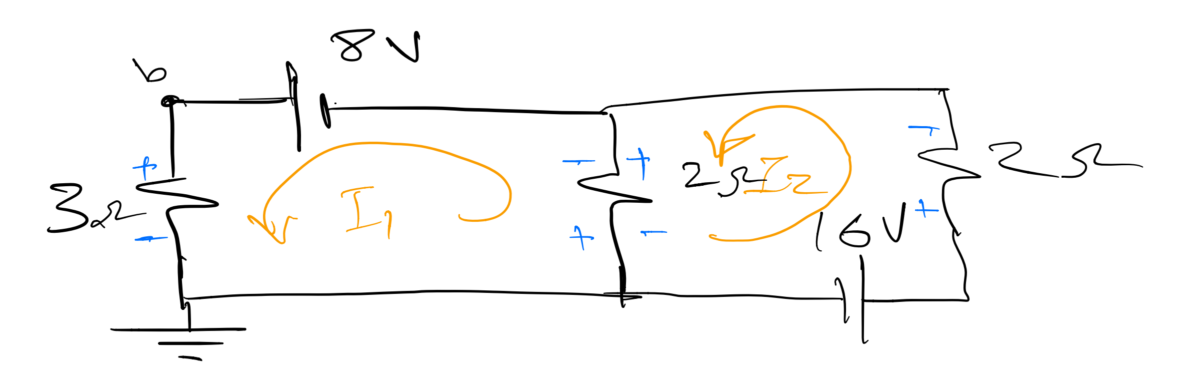
و KCL #





$$\frac{1}{R} = \frac{1}{3} + \frac{1}{9} + \frac{1}{18} = \frac{6+2+1}{18} = \frac{9}{18}$$

$$R = 2\,\Omega$$



$$8 - 3I_1 - 2(I_1 - I_2) = 0$$

$$8 - 5I_1 + 2I_2 = 0$$

$$5I_1 - 2I_2 = 8 \quad \text{——} \quad (1)$$

$$16 - 2I_2 - 2(I_2 - I_1) = 0$$

$$16 - 4I_2 + 2I_1 = 0$$

$$2I_1 - 4I_2 = -16 \quad \text{——} \quad (2)$$

$$I_2 = \frac{2I_1 + 16}{4}$$

من (2)

بالتعويض في (1)

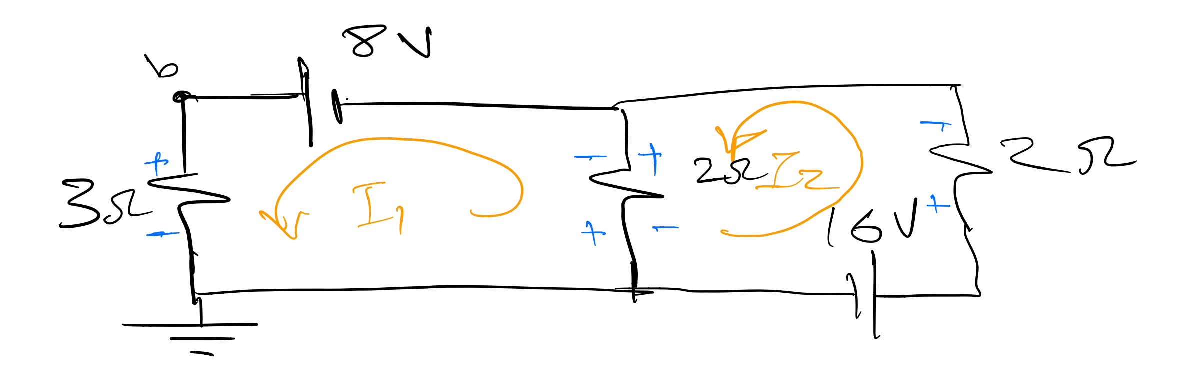
$$5I_1 - 2\left(\frac{2I_1+16}{4}\right) = 8$$

$$5I_1 - \frac{2I_1}{2} - \frac{16}{2} = 8$$

$$4I_1 - 8 = 8$$

$$I_1 = \frac{16}{4} = 4\,A$$

$$P_{8V} = 8I_1 = 8\times 4 = 32\,W$$



$$V_b = 3I_1 = 3\times 4 = 12\,V$$

$$V_{ab} = V_a - V_b = 0 - 12$$

$$V_{ab} = -12\,V$$

